

FINAL REPORT

Grant #: N00014-97-1-1005

PRINCIPAL INVESTIGATOR: Dr. Daniel P. Costa

INSTITUTION: University of California at Santa Cruz

EMAIL: costa@biology.ucsc.edu

GRANT TITLE: Acoustic Ecology of the Minke Whale

REPORTING PERIOD: 1 July 1997 to 30 July 1998

AWARD PERIOD: 1 July 1997 to 30 July 1998

OBJECTIVE: To determine the feasibility of studying the vocal behavior off minke whales off the coast of Queensland Australia. With an ultimate goal increasing our understanding of the vocal repertoire, the behavioral context and the source level of sounds produced by these animals.

APPROACH: Calls of minke whales, *Balaenoptera acutorostrata*, off the coast of NE Australia in July of 1997 were recorded utilizing a newly described population where minke whales maintain long contacts with vessels. A hydrophone array was used to link minke whales with a wide variety of new sounds, including a unique vocalization (Gedamke et al, 1997) that can be heard over long distances and used to remotely track animals' movements.

Recordings were made in the presence of minke whales aboard the vessel "Undersea Explorer" using a calibrated, two dimensional hydrophone array (5 "High Tech Inc." hydrophones, flat +/- 2db 50-32,000kHz). Surface and in-water observers noted locations, movement and behavior of whales. Spectral characteristics, received levels, and source levels of vocalizations were determined in Canary 1.5, Cornell's bioacoustics software. Vocalization times of arrival differences along the array were used to localize sound sources. Visually observed whales were linked to the sounds they produced. This close observation and study is uniquely possible due to the length and close range of minke contacts.

ACCOMPLISHMENTS: Over four-weeks, we encountered 61 minke whales and had extended (up to 11 hours/encounter), close contacts occurring with the majority. We recorded over 21 hours in the direct presence of at least 45 animals, a very large database compared to all previous records. This unique

19990702
690 69

situation allows for lengthy observations and study that is unheard of for the minke, and most any other whale.

SIGNIFICANCE: The success of 1997 pilot study proved that the Great Barrier Reef offers an unique opportunity to study the acoustic ecology of minke whales. This is because of the high density of inquisitive whales. This minke vocalization had been recorded remotely for 15 years by Australian researchers, yet its source remained unknown. The vocalization is also strikingly similar to the "boing" a sound recorded by North Pacific researchers for 40 years.

PUBLICATIONS AND ABSTRACTS:

Gedamke, J., D.P. Costa, and A. Dunstan. 1997. New vocalization definitively linked to the minke whale. Journal Acoustical Society of America 102(2):3121-3122.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED	
4. TITLE AND SUBTITLE		5. FUNDING NUMBERS	
Acoustic Ecology of Minke Whales		N00014-97-1-1005	
6. AUTHOR(S)		7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	
Daniel P. Costa Jason Gedamke		Dept of Biology University of California Santa Cruz, CA 95064	
8. PERFORMING ORGANIZATION REPORT NUMBER		9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	
		Office of Naval Research 800 N. Quincy St Arlington, VA 22217-5000	
10. SPONSORING/MONITORING AGENCY REPORT NUMBER		11. SUPPLEMENTARY NOTES	
12a. DISTRIBUTION/AVAILABILITY STATEMENT		12b. DISTRIBUTION CODE	
Distribution Unlimited			
13. ABSTRACT (Maximum 200 words)			
<p>Calls of minke whales, <i>Balaenoptera acutorostrata</i>, off the coast of NE Australia in July of 1997 were recorded utilizing a newly described population, where minke whales maintain long contacts with vessels. Recordings were made in the presence of minke whales aboard the vessel "Undersea Explorer" using a calibrated, two dimensional hydrophone array. Over four-weeks, we encountered 61 minke whales and had extended (up to 11 hours/encounter), close contacts occurring with the majority. We recorded over 21 hours in the direct presence of at least 45 animals. The high density of inquisitive minke whales at the Great Barrier Reef offers an unique opportunity to study their acoustic ecology.</p>			
14. SUBJECT TERMS		15. NUMBER OF PAGES	
minke whale, whale acoustics, vocalizations, bioacoustics		2	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL